2007 Annual Insect Report

UDAF

Utah Department of
Agriculture and Food

Summary of Invasive and Native Pest Risks

Insect	Damage
Africanized Honey Bee	Potential to disrupt Utah's $1.1 million honey industry, and cause health risks to humans and livestock
Apple Maggot and Cherry Fruit Fly	Fruit industry pest, potential to devastate Utah's $18 million fruit industry
Apiary Program	Agriculture is dependent on healthy pollinators
Asian Defoliators	Threat to Utah's $329 million wood products industry
Cereal Leaf Beetle	Potential to significantly reduce Utah's $343.3 million small grain and field crop industry
European Corn Borer	Potential to devastate Utah's $31.5 million corn harvest
False Codling Moth	Potential to cause significant damage to Utah's $18 million fruit industry
Gypsy Moth	Potential to destroy Utah's watersheds, forests, and residential landscapes
Japanese Beetle	Potential to significantly damage Utah's $20 million sod industry, Utah's $124 million nursery and floriculture industry, and the $18 million fruit industry
Mormon Cricket and Grasshopper	Potential to significantly reduce Utah's $343.3 million forage crop industry
Red Imported Fire Ant	Economic damage caused in the United States exceeds $5 billion, and is a public health risk
West Nile Virus	Public and animal health threat

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Division of Plant Industry
2007 Insect Report

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Cover photo by Todd Gilligan:
Light Brown Apple Moth (LBAM),
Epiphyas postvittana (Lepidoptera: Tortricidae)

Protecting Utah's Agricultural Industries from Invasive and Native Pests

Introduction

In the absence of pest management, harmful insects could seriously cripple Utah's billion dollar-a-year agricultural industries as well as destroy the natural beauty of the state of Utah. The future of Utah's food production environment and landscapes depends upon effective control of damaging insects by producers and governmental agencies.

The Emergency Insect Program began in 1985 with the enactment of the Insect Infestation Emergency Control Act (Chapter 35, Utah Code). The following information highlights the major insect programs conducted by the Utah Department of Agriculture and Food, Division of Plant Industry.

The Utah Department of Agriculture and Food, Division of Plant Industry is helping producers in the state to control harmful insects and other agricultural and public nuisance pests by: (1) establishing insectaries to rear natural predators for distribution; (2) trapping and monitoring insect movement, and (3) supporting research for better control methods that can be used in pest management programs.

We hope that you will find this publication to be informative and useful with regards to the insects that threaten the quality and viability of Utah's agricultural economy and environment.

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Acronyms and Abbreviations

AI	Active Ingredient
AGM	Asian Gypsy Moth
AHB	Africanized Honey Bee
APHIS	Animal Plant Health Inspections Service
BIFA	Black Imported Fire Ant
CAPS	Cooperative Agricultural Pest Survey
CLB	Cereal Leaf Beetle
FS	Forest Service
EDRR	Early Detection Rapid Response
GIS	Geographic Information System
GM	Gypsy Moth
IDW	Inverse Distance Weighting
ITD	Inter Trap Distance
PPQ	Plant Protection Quarantine
RIFRA	Red Imported Fire Ant
SITC	Safeguarding Interdiction Trade Compliance
UDAF	Utah Department of Agriculture and Food
USDA	United State Department of Agriculture
USU	Utah State University

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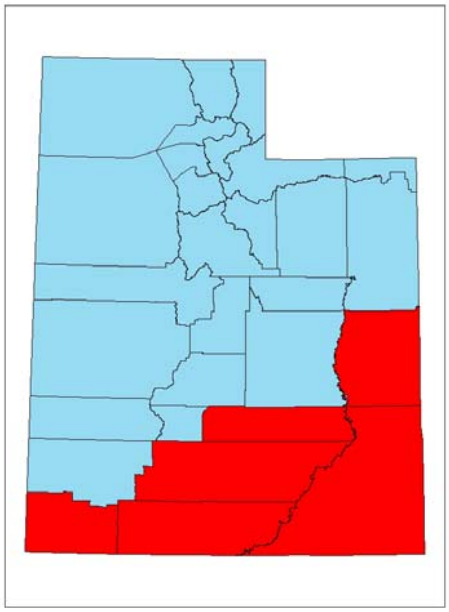
Africanized Honey Bee Detection Program

Economic Pest/ Public Health Threat

2007 Survey & Detection Program

Counties with Traps



The honey bee, *Apis mellifera*, plays a critical role in our food supply as a managed pollinator. Over 2 million bee colonies are moved across the country to rent bees for pollination, and the annual value of the resulting produce is estimated at over $10 billion. Honeybees are not native to North or South America; they were brought here in the 16th century for their wax and honey. There are more than 20 races of this bee, each with different history and characteristics, but most North American beekeepers keep Italian or German races. The Africanized honey bee (AHB) is a famous race due to its defensive behaviors. It originates in Africa, and it was introduced to the Americas via Brazil in 1956. Since then, it has radiated steadily into new territory, arriving in the USA in 1990. The limit of habitable climate for the migrating Africanized Honey bee is unknown, but it is currently found in Arizona, Nevada, New Mexico, Texas and Southern California. This suggests that it could survive in Utah, although it has still not been found here.

Although this bee has been sensationalized in the media, since its introduction to the USA there have been fewer than 20 human deaths due to AHB attacks. It is a health threat because it stings more readily and in greater numbers than other honey bee races. The largest detriment by far would be to the beekeeping industry itself. AHB colonies are small, they abandon their nests frequently, and they defend their nests much more aggressively. The necessary changes to manage what ultimately may not be a more productive bee would cause hardship among Utah's beekeepers. Utah has approximately 340 registered beekeepers, who produced $1.1 million dollars worth of honey in 2007.

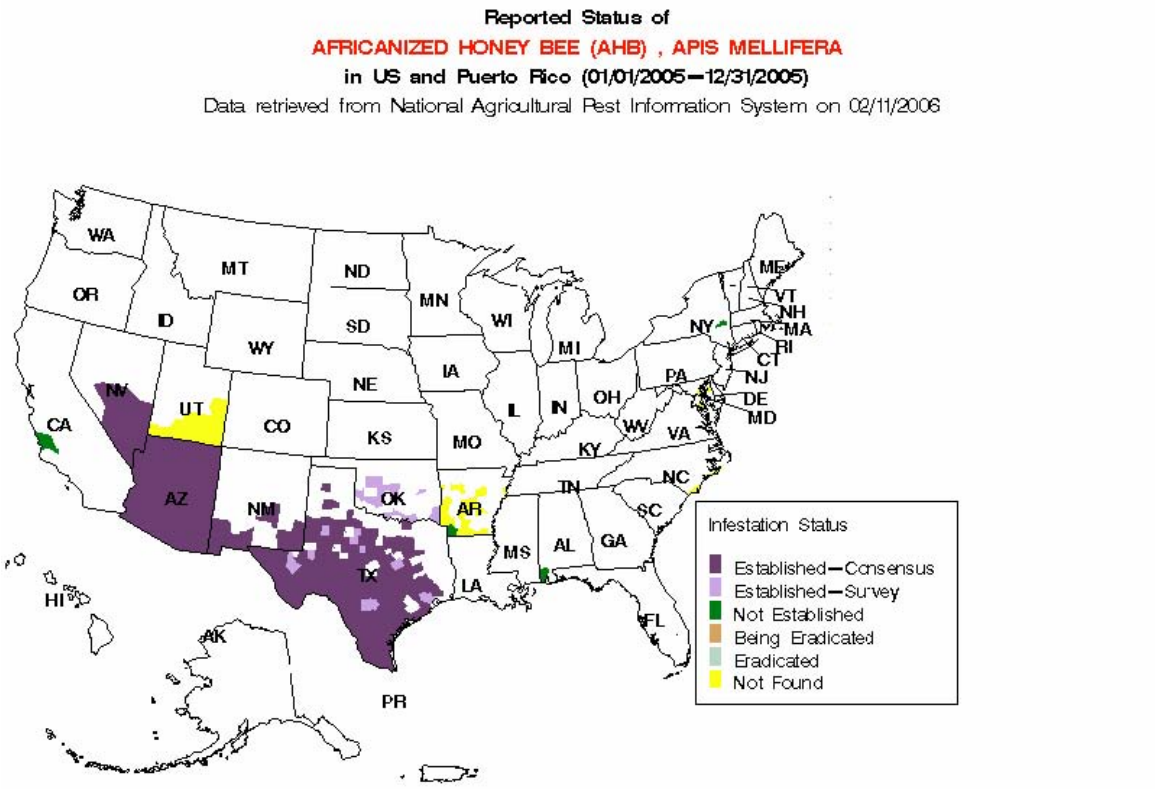
Rather than imposing additional regulations, the Utah Department of Agriculture and Food will work with Utah's beekeeping industry for early detection through survey, management, and education of beekeepers and other stakeholders.

The Utah Department of Agriculture and Food has put into action a survey and detection program in the southern portion of the state consisting of about 100 detection traps placed

in the most likely bee migration corridors. Although bees were found in the traps in the 2007 survey, none were Africanized honey bees.

Action Plan for 2008

The Africanized honey bee remains a serious threat to Utah's beekeeping industry, and also poses a public health threat. In 2008 UDAF will continue detection trapping of the Africanized honey bee to determine if it has migrated into the state. UDAF will also continue to educate beekeepers, bee inspectors and the general public about the honey bees in general, and the specific differences and concerns regarding the Africanized honey bee.



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.

Apiary Inspection Program

Beneficial Insects/Agricultural Industry Support

Utah has approximately 340 registered beekeepers, Table 1 shows the number of registered beekeepers in Utah's Counties. Most are hobbyists, with fewer than 10 hives, but there are several large commercial beekeepers and some mid-size operations in Utah who earn at least part of their living keeping bees. Many transport colonies cross-country for pollination contracts and together they produce over 1 million pounds of Utah honey annually. Like most agriculture, this industry is vulnerable to weather conditions, but there are additional concerns specific to beekeeping. In particular, there are diseases and parasites that can be introduced with bee imports or spread from neighboring colonies. Since bees fly up to 5 miles to collect food and return to the hive, many environmental hazards can also impact colony health. For this reason, educating the public, growers, and pesticide applicators protects the beekeeping industry.

Table 1: Number of Registered Beekeepers in Utah, 12/07

County	# Registered Beekeepers
Box Elder	11
Cache	21
Carbon	1
Davis	41
Duchesne	5
Emery	2
Iron	4
Juab	5
Kane	1
Millard	7
Morgan	1
Rich	1
Salt Lake	103
San Juan	1
Sanpete	9
Sevier	6
Summit	2
Tooele	15
Uintah	3
Utah	61
Wasatch	1
Washington	8
Weber	21
out of state	9
Total	**339**

To support Utah's beekeeping industry, UDAF employs a State Entomologist who monitors migrating beekeepers at Utah Ports of Entry, and also trains the Port staff to keep them current on policies and risks posed by bee transport. In addition to the State Entomologist, several counties employ County Bee Inspectors. The County Bee Inspectors are the primary points of contact for beekeepers, it is their job to inspect all colonies annually, and be available to assist beekeepers as needed.

Keeping honey bees has become increasingly complicated over time, primarily due to pathogens and parasites that infest and damage colonies. Newly introduced parasites and pathogens present a constant threat in today's global market, where bees are moved long distances quickly. The parasitic *Varroa* mite is one example, introduced in the 80's and still one of the most damaging pests to bees. Before the *Varroa* mite, American Foulbrood (AFB) was the most devastating disease in colonies. Both *Varroa* and AFB are widespread in Utah. Treatments and remedies have been developed, but only following heavy losses. Small hive beetle is a more recent pest that continues to spread across the USA with bee transport, although it has not been found in Utah. And for the last year, Colony Collapse Disorder (CCD) has caused vast losses to the beekeeping industry, and researchers have yet to determine its cause. The impact of CCD on Utah bees is not clear. Bee inspectors are the front line to identify these maladies, support beekeepers to keep healthy bee colonies and protect their industry in Utah.

Inspection Activity and Colony Health

County Bee inspectors visited over 3400 colonies throughout the state. Table 2 shows the number of colonies inspected by each of the County Bee Inspectors and the incidence of disease.

Table 2: Number of colonies inspected in Utah, 2007

County	# colonies inspected (apiaries)	# diseased colonies (%)
Weber	310 (21)	1 (0.3)
Millard	417 (25)	3 (0.7)
Tooele	624 (13)	4 (0.6)
Sanpete	168 (10)	0 (0)
Salt Lake	18 (16)	1 (5.5)
Utah	1900 (28)	16 (0.8)
Cache	48 (18)	5 (10.4)
Totals	**3485 (131)**	**30 (avg 2.6%)**

The overall incidence of diseased colonies in 2007 was low, averaging 2.6% of colonies. Colonies infected with the bacterium American Foulbrood required action due to the persistence of this disease once symptoms are expressed. Depending on the severity of the symptoms, colonies were treated with antibiotics or the bees were shaken into new equipment, and the diseased equipment was burned. *Varroa* mites were ubiquitous, and most beekeepers were using treatments for the parasites. No small hive beetle was detected. No cases of Colony Collapse Disorder were observed, although colony losses were common and it can be very difficult to know the cause of death in a colony.

Outreach Activities

In addition to monitoring bee transport at Utah's ports, UDAF and the County Bee Inspectors offer many resources to beekeepers. The Cache Valley Bee Inspector works closely with 4-H Programs to train young new beekeepers. The Utah County Beekeepers also support and mentor young beekeepers, and offer educational programs to promote better beekeeping practices. UDAF offered two disease workshops in Salt Lake City specifically to teach beekeepers to identify honeybee health problems. These two hour courses included a slide presentation and a lab section using hands-on materials. The Salt Lake County Bee Inspector promoted the industry through radio, print and television interviews, public events to educate with a honeybee observation hive, and pollinator walks in natural areas. In addition, approximately 1400 agricultural inspectors and pesticide applicators statewide were educated through 15 lecture presentations of "How to Protect Pollinators from Pesticide Poisoning". These efforts serve the industry by raising awareness of why we should value these beneficial insects, and by educating beekeepers, growers and especially pesticide applicators about how to avoid killing bees.

Action Plan 2008

The Utah Apiary Inspection Program will continue to support beekeepers and agriculture. In addition to normal apiary and port inspection activities, UDAF will update the Utah Bee Inspection Act in 2008, soliciting suggestions from beekeepers and bee inspectors to ensure that regulations best serve the industry.

Apple Maggot / Cherry Fruit Fly Survey Program

Quarantine Pest


www.ncw.wsu.edu


www.vegedge.umn.edu

2007 Survey Program

The apple maggot (*Rhagoletis pomonella*), also known as the "railroad-worm", and the cherry fruit fly (*Rhagoletis indifferens),* are both picture-wing flies native to North America. Both insects have become a major pest of fruit trees in the U.S. and Canada.

Fruit marketed for export must be free from all apple maggot and cherry fruit fly injury. Therefore, thorough and effective control measures are necessary. There are more than 300 commercial fruit growers in Utah, with a commercial value of more than 18 million dollars annually. With Utah's apple maggot and cherry fruit fly program in place, fruit growers in Utah are able to export fruit to states that have quarantines against these pests. *All western states have apple maggot and cherry fruit fly quarantines.*

The Apple Maggot Program began in 1985 with the discovery of the apple maggot fly in Utah County; it has been subsequently amended to include cherry fruit fly detection and control. The program provides commercial growers with information to improve insecticide spray timing. Accurately timed sprays result in fewer insecticides being used with less harm to the environment and lower production costs. Without proper control, these insects could cause serious damage to all tree fruit grown in the state.

Apple maggot catches have decreased from over 60 in 1994 to less than 10 in 2002 and 0 in 2007. UDAF employees monitor approximately 600 insect traps during the growing season. *No apple maggots have been found in commercial orchards. All apple maggot catches have been in abandoned or non-commercial orchards.*

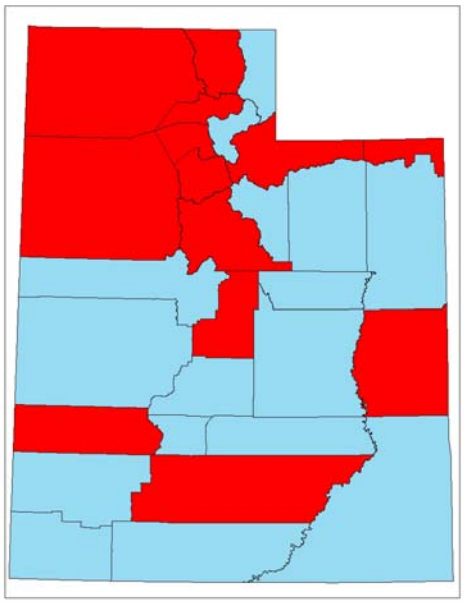
Action Plan for 2008

UDAF plans to continue its detection trapping program in 2008, providing commercial fruit growers with vital information to prevent apple maggots and cherry fruit flies from spreading and affecting the quality and marketability of Utah's commercially grown fruit.

Asian Defoliator Detection Program

Defoliator/Forest Pest
Funded USDA APHIS CAPS

Counties with Traps



2007 Survey & Detection Program

Utah Department of Agriculture and Food placed twenty five traps specifically for target species, in high-risk areas of the state. Traps were placed along shipping vectors within the state of Utah, such as railroads and highways. Airports and military bases were trapped also. Thirteen of twenty nine counties had traps in 2007. The introduction of new Asian Defoliator species could take a serious toll Utah's 329 million dollar wood products industry (USU 2006). Exotic forest insects pose a significant threat to the economic viability of this industry. The Utah ornamental industry generated 43 million in sales during 2006 (UDAF 2006). Therefore specific survey and detection work is required for each individual species to enhance the probability of early detection. Eradication programs can cost over a million dollars and infestations can affect the economy as a whole. Asian Defoliators are considered a serious threat to the state of Utah.

Asian Gypsy Moth Survey

The Asian gypsy moth (AGM) (Lymantria dispar), named for its home continent, is a voracious pest and an introduction into the US would pose a major threat to the forest habitats on the North American continent. This is due to the broad range of host plants this insect will feed on. AGM feeds on over 500 trees and shrubs, including larch, oak, poplar, alder, willow, and some evergreens. Older larvae will also feed on a number of conifers such as hemlock, pine, spruce and southern white cedar. AGM defoliation would severely weaken trees and shrubs, killing them or making them susceptible to diseases and other pests. Females tend to lay eggs indiscriminately and egg masses can contain up to 1200 eggs. Female AGM are active flyers that are capable of flying up to 25 miles furthering the spread causing catastrophic economical and ecological consequences. Because of the threats AGM poses, survey is needed for early detection. When Asian gypsy moth is detected in the US, a mandatory eradication program is implemented.
Asian Gypsy Moth is not known to be established in North America, but early detection and eradication has occurred in California, Oregon, Idaho, Texas and Washington states.
All traps in Utah were negative in 2007.

Rosy (Pink) Gypsy Moth Survey

Rosy (Pink) Gypsy Moth - *Lymantria mathura* If introduced, Rosy Moth has the potential to spread over the full range of its potential hosts in North America. Early detection would be difficult unless specific surveys are conducted. Both male and female adults are capable of flying and could disperse over distances of several miles either on their own or assisted by air currents. Early instar larvae are also subject to dispersal by air currents. This insect has a high reproductive potential and during outbreaks, females tend to lay eggs indiscriminately on a variety of sites including ships and products destined for export. All traps in Utah were negative in 2007.

Siberian Silk Moth Survey

The Siberian Silk Moth, *Dendrolimus superans sibiricus,* attacks hosts or products with significant commercial value such as for timber, pulp, or wood products.

Siberian Silk Moth is a defoliator of pine, fir, and spruce species. The risk to all conifers in the United States is extreme. The Siberian silk moth can spread between 12 and 50 km per year. Females can lay up to 300 eggs making populations of this pest increase rapidly. The pest is native to northern Russia, but it has spread throughout Russia, Kazakhstan, northern China, Korea Democratic People's Republic, Korea Republic, and northern Mongolia. All imports from these areas packaged in wood products are high risk for possible infestation. No Siberian silk moths were caught in 2007.

Nun Moth Survey

The Eurasian Nun Moth, *Lymantria monacha* (L.)(Lymantriidae), Nun moth larvae feed on and kill primarily conifers (*Picea, Pinus, Abies,* and *Larix* spp.) but can also defoliate deciduous trees and shrubs (*Fagus, Carpinous, Betula,* and *Quercus* spp.). One female lays on the average 20 to 100 eggs per egg mass. Then may fly to another location before depositing additional clusters of eggs furthering the expansion of infestation laying between 200-250 eggs total. Its establishment in this country would be catastrophic because it feeds on a variety of vegetation and can migrate and colonize in a variety of places. The nun moth is the most serious defoliating insect pest of the Scots pine, Norway spruce and some other tree species. One caterpillar can damage about 300 Scots pine needles or 1000 Norway spruce needles during its development. A spruce tree defoliated more than 50% usually dies. Nun moth outbreaks are usually pandemic. The nun moth is distributed throughout Europe, however major damage has been caused in Central Europe (Poland, Germany, Czech Republic, Austria, Romania, Byelorussia, etc.). Nun moths cause more damage in continental Europe than any other forest defoliator, including the gypsy moths. The Siberian risk assessment (USDA Forest Service, 1991) stated that if the Eurasian nun moth would become established, 172 million acres could be affected in the United States. No Nun Moths were caught in 2007

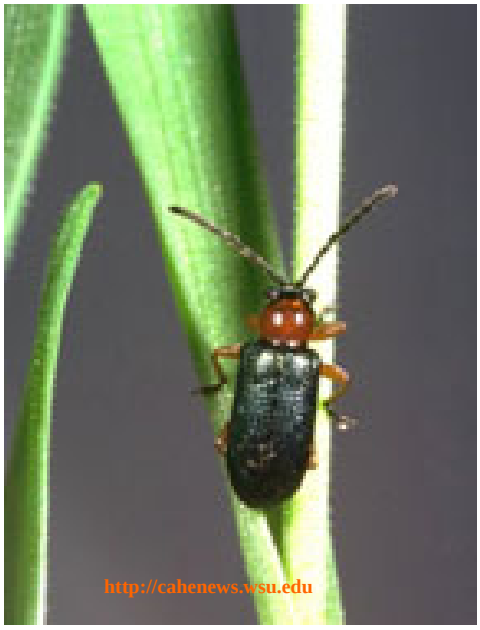
Action Plan for 2008

Utah Department of Agriculture and Food will continue to identify high risk areas within Utah, and plans to set another 100 traps in 2008. Catching these pests before infestation is imperative.

Cereal Leaf Beetle Survey Program

Quarantine Pest

Figure 1: Adult Cereal Leaf Beetle



2007 Survey Program

Utah conducts an extensive statewide survey of the cereal leaf beetle, *Oulema melanopus*, covering all 29 counties each year to determine the distribution and population levels statewide. The cereal leaf beetle (CLB) has been spreading across the U.S. for about 50 years. In Utah, it was first recognized in Morgan County in 1984, where it was causing economic damage on barley, oats and wheat. Since then, it has infested the cooler, moister counties in Utah. Small grains and field crops represent Utah's greatest agricultural strength, with a 2007 total production value over $340 million dollars. In 1984, the Utah State Department of Agriculture and Food began conducting an annual statewide survey for this pest to determine if any CLB life stage is present and the extent of infestation in the grain growing counties of the state, in part to satisfy the requirements of the California Cereal Leaf Beetle Quarantine. *Many western states have a quarantine in place for the cereal leaf beetle, including Arizona, California, and Nevada.*

This survey examines grain fields in each of Utah's 29 counties, including whenever possible irrigated fields of wheat, oats and barley, to recognize and report which counties have CLB. Surveys were conducted between May and July using a USDA standard method. If no specimens were collected or observed and only suspected feeding damage was observed during these sampling procedures, the field was considered free of cereal leaf beetle infestation for 2007.

Larvae were collected whenever possible to determine parasitism by *Tetrastichus julis*, a biological control agent introduced to control CLB in Utah, a project funded by USDA/APHIS PPQ. Larval dissection and parasite identification were performed in the lab of Dr. Edward Evans, Biology Dept., Utah State University, Logan, Utah.

Figure 2: Parasitoid wasp *T. julis* with cereal leaf beetle larvae.

All 29 counties of the state were surveyed which included a total of 935 observations and 187 field sites. Overall, the distribution of cereal leaf beetle was similar to previous years with some notable exceptions. In previous years, the beetle was found in Duchesne County, but this year it was not. Four years ago, one specimen was found in Piute County, but no specimens have been found there for the last three years. It appears that the beetle has died out and the county is free of cereal leaf beetle. Figure 3 shows the distribution and density of CLB in each of Utah's counties, Figure 4 shows the amount of parasitism by *Tetrastichus julis* in the counties where larval samples were collected and analyzed.

The cereal leaf beetle population survey in 2007 showed little change from 2006. Notable differences include Duchesne County, which had CLB in previous years but none were caught in 2007, and Piute County, which had CLB in 2004 with none found since. Since no CLB has been found in Piute County in three consecutive years, it is considered to be CLB free. The parasitic wasp that was introduced as a CLB biocontrol, *T. julis*, was found established in CLB populations throughout the state.

Figure 3: 2007 Cereal Leaf Beetle Survey

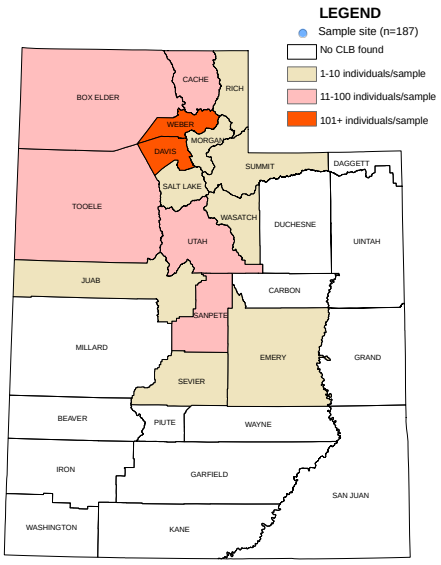
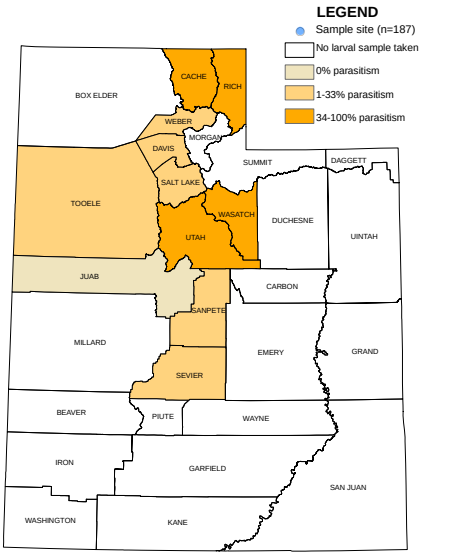


Figure 4: 2007 Cereal Leaf Beetle Parasitism by *T. julis*



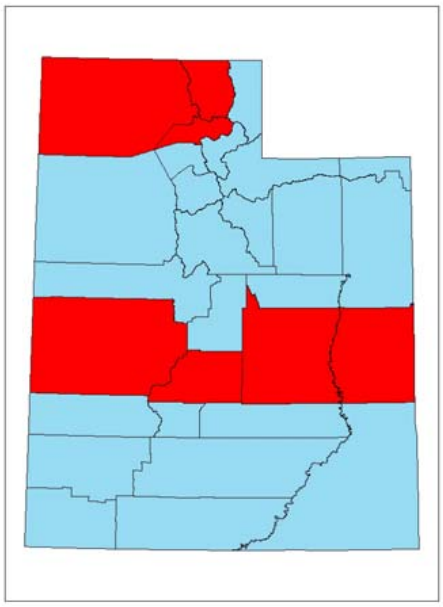
Action Plan for 2008

The cereal leaf beetle presents a serious threat to Utah's agricultural industry. UDAF will maintain its survey program to monitor this quarantined insect and ensure the phytosanitary certification necessary to export of hay and grain to other states and countries. UDAF will also continue to provide funding and expertise to the cooperative insectary program at USU to produce CLB biological controls.

European Corn Borer Detection Program

Quarantine Pest

Counties with Traps



2007 Survey & Detection Program

Utah has a quarantine (R68-10) in position for small grains and other agricultural crops that may contain the European corn borer *Ostrinia nubilalis* (Hübner) to prevent this destructive insect from entering the state. A trapping program is launched every year in chief corn producing areas for this pest. In 2007, 72 traps were positioned in eight counties. During its early history in the United States, the European corn borer spawned one generation yearly. By the late 1930's, a two-generation per annum European corn borer mushroomed swiftly and became dominant in the central Corn Belt. It established itself in Illinois in 1939, Iowa in 1942, Nebraska in 1944, and South Dakota in 1946. Meanwhile, the single-generation European corn borer extended northward into northern Minnesota, North Dakota, and Canadian provinces of Quebec, Manitoba, and Saskatchewan.

The Utah Department of Agriculture and Food (UDAF), in association with the United States Department of Agriculture (USDA), launched a European corn borer trapping program. This program took place in eight counties throughout Utah. The counties where traps were set are: *Cache, Box Elder, Weber, Davis, Utah, Sevier, Sanpete, and Emery County.* No new records of the European corn borer were found in the state of Utah in 2007.

County	# of Traps
Cache	12
Box Elder	12
Weber	12
Davis	12
Utah	6
Sevier	6
Sanpete	6
Emery	6

Action Plan for 2007

UDAF will persist in its trapping program to detect the occurrence of European corn borer. Detection information is crucial to producers so they can protect their crops from this devastating insect. Approximately 100 traps will be placed in the corn producing areas of the state.

Exotic Pest Detection Program

Defoliator/Forest Pest
Funded USDA APHIS CAPS
Erin W. Hodgson, Department of Biology, Utah State University

Figure 1. Egyptian cottonworm adult.[1]

Figure 2. Egyptian cottonworm prepupa.[2]

Figure 3. Silver Y moth adult.[3]

Figure 4. Silver Y moth larva.[3]

2007 Survey & Detection Program

The Egyptian cottonworm, *Spodoptera littoralis* (Lepidoptera: Noctuidae), is a polyphagous feeder and has the potential to infest many cropping and horticultural systems in Utah. More importantly, the Egyptian cottonworm can feed on alfalfa, the most important crop in Utah (2,200 tons harvested in 2004 worth more than $114 million). Although a wild population has not been identified in the United States, Egyptian cottonworm is established in the Mediterranean, the Middle East, and in most of Africa. With at least seven generations per year in its native habitat, the adults are well-known for their migratory potential (Figure 1). Also known as the African cotton leafworm, this invasive species has been accidentally imported with cultivated plants in the United Kingdom. The larvae can feed on many different vegetables, fruits and greenhouse plants (Figure 2). The likelihood of Egyptian cottonworm invading Utah crops is probable; the entry potential is estimated to be high, the establishment potential is medium-high, and the potential economic impact of establishment is high. On most crops, Egyptian cottonworm larvae can completely devour leaves and cause a severe yield reduction if left untreated. The early detection and eradication of the Egyptian cottonworm in Utah is essential for reducing the potential negative impact to growers.

The Silver Y moth, *Autographa gamma* (Lepidoptera: Noctuidae), is also a polyphagous feeder and commonly found in Europe, Asia, and northern Africa. Silver Y moth larvae feed on alfalfa, many vegetables and low-growing weeds. Alfalfa is the largest cash crop in Utah, worth more than $144 million in forage for animals). The likelihood of Silver Y moth damaging Utah crops is also high; the entry potential is medium, the establishment potential is high, and the potential economic impact of establishment is high. Larvae can skeletonize leaves resulting in severe economic injury. Although no wild populations currently exist in the United States, the early detection of Silver Y moth in Utah and surrounding states is important for growers. Undetected populations could lead to devastating yield loss if not eradicated in a timely manner.

Utah State University Cooperative Extension Agents were agreed to collaborate in trapping for their respective counties. Sticky traps with pheromone lures (Trece Pherocon® IC Trap) specific for each insect were placed in three locations per county. All traps were operated near favorable host plants (i.e., alfalfa, small grains, vegetables) depending on crop production in each county. There were two trapping periods for each location, with each period lasting for about 2-3 weeks. Trapping periods were variable because of the variable growing season fluctuation within Utah; some traps started in June while others started in July. After each trapping period, sticky cards were sent to Utah State University for examination by Dr. James Pitts.

Nearly every county in Utah was surveyed for Egyptian cottonworm and Silver Y moth in 2007 (26 out of 29 counties). Due to inclement weather and animal damage, some counties did not have three locations. In total, 147 sticky traps were examined. Flies (Muscidae, Cecidomyiidae) and lady beetles (Coccinellidae) were commonly found on the sticky cards and assumed to be transient catches. Egyptian cottonworm and Silver Y moth were not detected on any of the sticky cards for the 2007 survey in Utah.

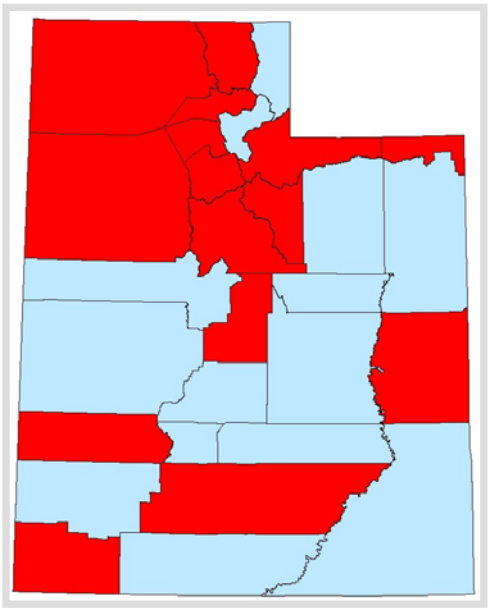
Image Citations

1. Image courtesy of Paolo Mazzei (www.ipmimages.org).
2. Images courtesy of Bernard Fransen (www.ipmimages.org).
3 Images courtesy of Esmat M. Hegazi (www.ipmimages.org).

False Codling Moth Detection Program

Fruit and Agricultural Pest
Funded USDA APHIS CAPS

Counties with Traps



2007 Survey & Detection Program

False codling moth, *Thaumatotibia leucotreta*, is a significant pest of fruit trees and field crops in Africa. Climates suitable for this pest vary from tropical, to dry or temperate. False codling moth is native to Ethiopia, and is present in much of Sub-Saharan Africa. Based on the classification of climate zones, 20% of the United States represents suitable habitat for this pest. Much of the suitable habitat within the United States falls within Utah's borders (Figure. 1).

High risk crops in Utah include all fruit trees and corn. In addition, several wild plants native to Utah are possible hosts. Utah's fruit industry is valued at more than $18 million annually, and corn is a $31 million industry; both of could be significantly damaged by a false codling moth infestation.

In 2007, 95 traps were placed in 15 counties; traps were placed in residential neighborhoods to monitor areas near nursery retailers. Zero catches of the false codling moth occurred in 2007.

2008 Action Plan

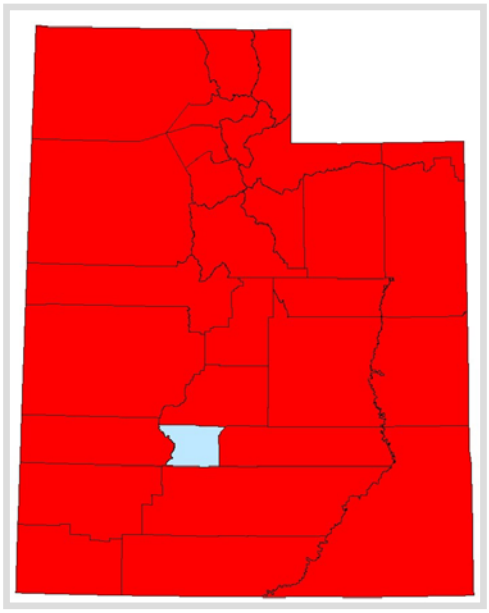
The Utah Department of Agriculture and Food will continue it's trapping efforts in 2008 by targeting high risk areas: businesses and the paths through which they bring their products to Utah. 100 traps will be placed and checked bi-weekly.

Figure 1. Predicted distribution of *Thaumatotibia leucotreta* in the continental United States according to CAPS risk assessment.

Gypsy Moth Detection Program

Defoliator/Quarantine Pest
Funded USDA APHIS CAPS, USDA FS, UDAF

Counties with Traps



2007 Survey & Detection Program

The North American Gypsy Moth (GM) Survey and detection program is conducted by large scale trapping along the Wasatch Front and throughout Utah. Gypsy Moth infestations cause severe damage by defoliating trees. When populations are found, they can be treated and effectively eradicated before damage occurs. The 2007 Utah Gypsy Moth Program placed 2535 detection and delimiting traps based on the GMWest model BioSIM. This model integrates climate and elevation to predict the probability of GM establishment.

Gypsy Moths were first found in Utah in 1988. Since that time Utah Department of Agriculture and Food has been the lead agency in the administration of a major survey and control program. Utah's arid climate and mountainous terrain have a high potential for Gypsy Moth infestation and subsequent mass deforestation. Since Utah is not part of the contiguous range of Gypsy Moths in the Eastern United States, a program of Gypsy Moth prevention and eradication is the most cost effective and beneficial strategy.

Eradication measures thus far have been successful using the biological insecticide *Bacillus thuringiensis var. kurstaki (*B.t.k). B.t.k. is a naturally occurring soil bacterium that kills Gypsy Moth larvae with minimal environmental impact. This insecticide was first used in Utah in 1989, treating over 70,000 acres. In May 1999, 764 acres in one location of Salt Lake County were sprayed with B.t.k. This spray program was initiated after 32 Gypsy Moths were detected at seven locations in 1998. Only seven moths were caught the following year, and the number of catches dropped to zero in 2006 and two in 2007. Figure 1 shows trap catches and treatment applications.

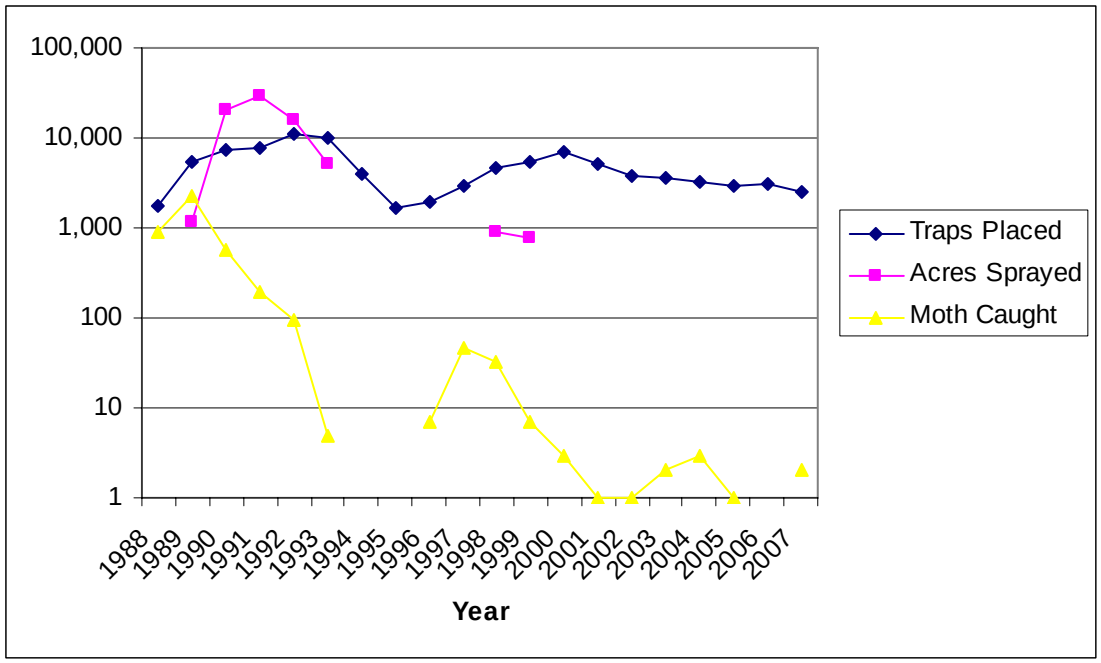
Detection Traps

Two single catches were found in Salt Lake County, one in West Valley and the other in Sandy (Figure 2). Appropriate actions will be reviewed and implemented for the 2008 season.

Delimiting Traps

Moths were detected in the Pine Brook area in 2004 and 2005, but no Gypsy Moths were detected in 2006 or 2007.

Figure 1: Gypsy Moth Traps Placed, Moths Caught and Treatments 1988-2007



Action plan for 2008

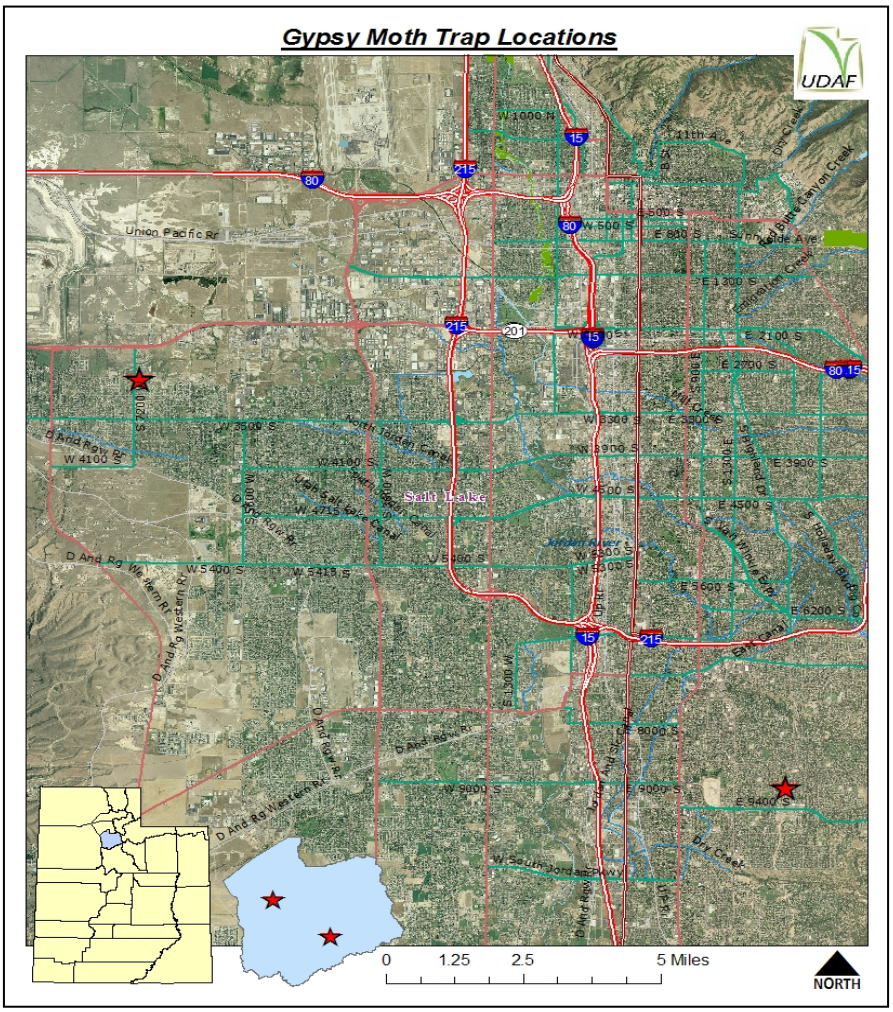
The 2007 survey detected two gypsy moths in Utah, one in West Valley City and the other in Sandy City, Utah. Both locations will be considered high priority in 2008 and appropriate actions will be taken. A 500' grid of traps will surround each positive location. These traps will be monitored on a regular basis.

The cooperative Gypsy Moth survey and detection program for 2008 plans to include placement of 2000 to 3000 traps for the state detection network. The 500' delimiting grid in the Pine Brook area will be replaced by a standard detection because of negative gypsy moth catches in 2006 and 2007. Review of the Risk Class categories for the State of Utah determined that along the Wasatch Front, the Category 1 inter- trap distance (ITD) of 1330 feet (1/4 mile) is unnecessary for the trapping program and that it would be expanded to an ITD of 2640 feet (1/2 mile). Placements will be staggered from year to year to cover greater area over time. This will reflect the standard method of trapping according to the USDA, APHIS Gypsy Moth Manual. Trap placements will continue to be reviewed annually.

To keep the Utah Cooperative Gypsy Moth Survey and Detection Program current, the GMWest phenology model will be updated with current year weather data. Trap placement will also be updated according to risk class categories, and education efforts to

raise awareness of gypsy moth pest potential will be directed at campground hosts and similar stakeholders.

Figure 2: Location of Gypsy Moth Catches in 2007 (one moth per trap)

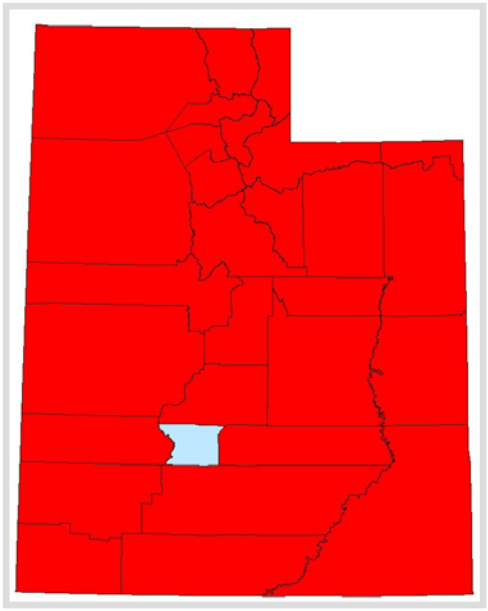


Japanese Beetle Detection Program

Quarantine Pest

2007 Survey & Detection Program

Counties with Traps



The Japanese beetle *Popillia japonica* Newman (JB) has swept through most of the Eastern U.S. It is a highly ruinous plant pest causing both plant damage and increased control costs. Adults attack more than 300 species of plants, including numerous trees, ornamental shrubs & vines, fruits, flowers, vegetables, garden crops, weeds, and field crops. Larvae are serious pests of lawns, other grasses, and nursery stock. Because of the ease of shipping grubs with nursery stock & soil, is a serious threat to Utah's $124 million nursery and floriculture economy. When a JB infestation was discovered in Orem, Utah in 2006 an eradication effort was devised to maintain Utah as a Category 1 Uninfested/Quarantine Pest State in compliance with the U.S. Domestic Japanese Beetle Harmonization Plan. The Western states protected by this quarantine are: *Washington, Oregon, Idaho, California, **Utah**, Arizona,* and *Nevada* with *Montana* in the process of being annexed to the list.

The JB infestation in Orem resulted in increased trapping efforts throughout Utah. In previous years, approximately 500 traps were placed statewide. With the discovery of this established population, statewide trapping increased to 2,993, the bulk of which were placed in Utah County (Figure1, Figure 2). In Utah County, 695 delimiting traps covering an area of roughly 9 square miles were baited with a dual lure and placed in a 250' grid centered in the 2007 treatment area. The 250' grid was surrounded by a 500' grid located in and on the periphery of the 2007 treatment area. The 500' grid was surrounded by a 1000' grid which occupied Orem City and small parts of Lindon and Provo City. Throughout the rest of Utah County 5 traps per square mile were maintained. A total of 695 delimiting traps and 725 detection traps were maintained in Utah County in 2007. Traps throughout the rest of the state were placed at the rate of 2 per square mile in areas suitable for JB introduction and establishment.

Utah also has trapping survey and detection program in place outside Utah County. In 2007, a total of 581 traps were set in the following counties: *San Juan, Wayne, Grand, Emery, Sevier, Carbon, Uintah, Duchesne, Utah, Salt Lake, Davis, Weber, Rich, Cache,* and *Box Elder* (Figure 1).

Figure 1: Statewide JB trap density, 2007

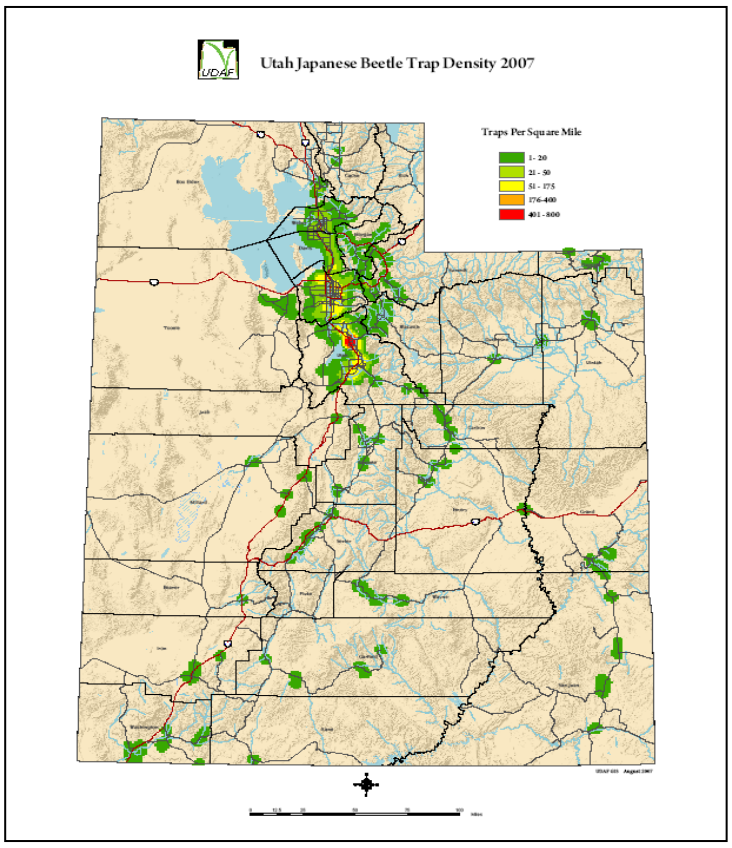
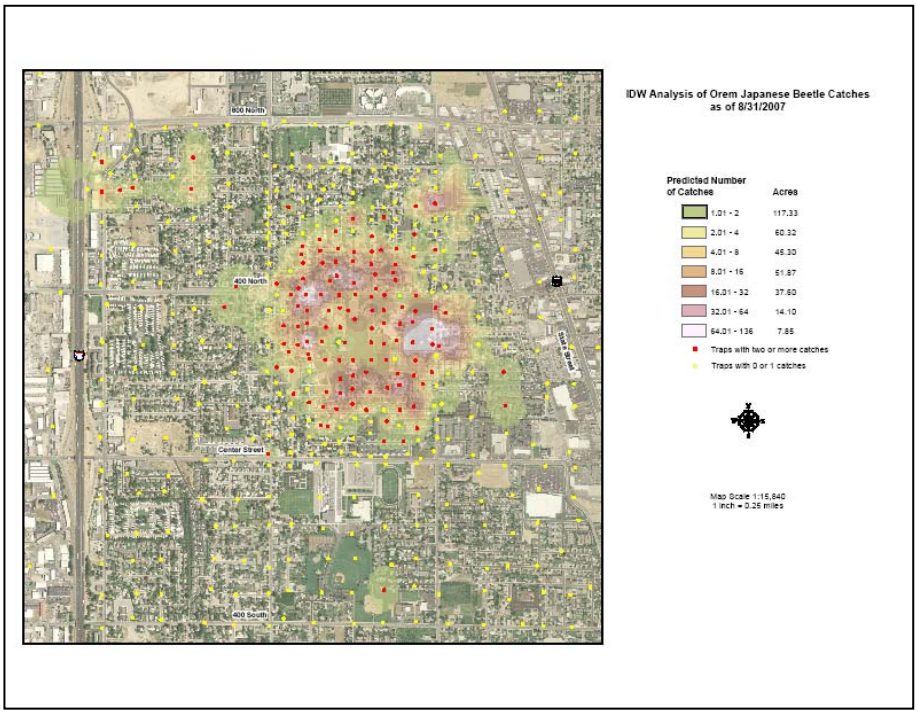


Figure 2: Inverse Distance Weighting of JB trap catches in Orem, 2007

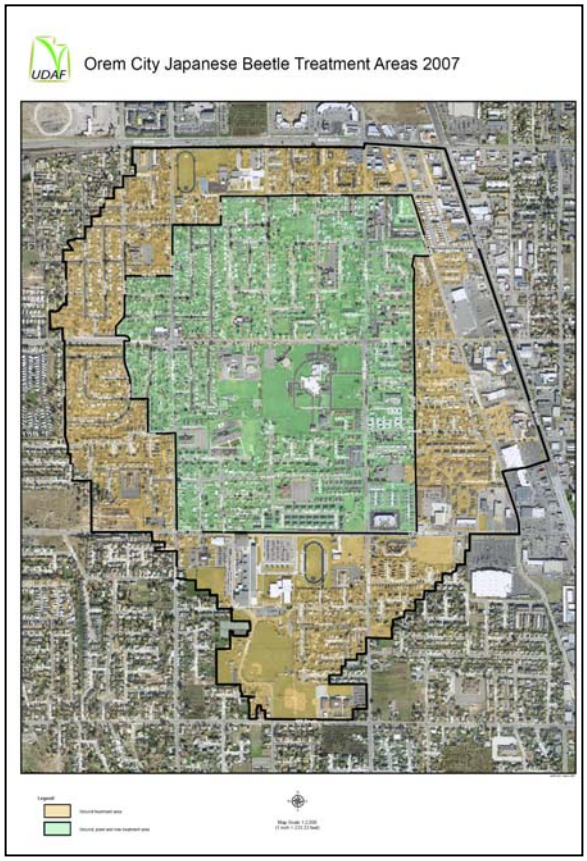


2007 Treatment Program

In addition to increased trap densities and containing green waste to limit dispersal, chemical treatment included turf and planting bed treatment with Merit ® 2F to kill JB larvae, and foliar treatment with application of two treatments, Tempo® SC Ultra on above ground ornamental foliage and Carbaryl 4L on food bearing crops (Figure 3) to kill adult JB. In addition to public information meetings, notification preceded and followed treatment as required in the Declaration of Insect Emergency. UDAF staff accompanied pesticide applicators to answer questions, keep records and assure proper application.

Large expanses of turf were treated with Merit® 0.5G, a granular formulation. The product was applied using a turf tractor at a rate of 80 pounds to the acre. These treatments were done at night to lessen the impact on the recreational use of the areas. Turf treatment was finished on June 18 with a mop up of missed properties on June 21. The Merit® 2F treatment encompassed 480 acres and 2,200 residences requiring the use of 5 trucks per day. Merit® was mixed at 1.25 pints per 100 gallons of water, resulting in the application of 0.39 lbs. of active ingredient (A.I.) per acre. Tank samples were taken during the course of treatment to verify concentration.

Foliar treatment began on July 5, 2007 and consisted of two treatments, Tempo® SC Ultra on above ground ornamental foliage and Carbaryl 4L on food bearing crops. Tempo® is not labeled for use on food crops. Because carbaryl has a short tank life, fresh product was mixed at least every 4 hours to maintain efficacy. Tempo® was applied at a rate of 5.4 ounces per 100 gallons. Carbaryl was mixed using 32 ounces per 100 gallons. Tank samples were taken during the course of treatment to verify concentration. The foliar treatment area involved about 250 acres and 1,200 residences. Carbaryl application was required on 430 of the properties.



Trapping detected a small population northwest of the treatment area which required a late season larval control treatment. On August 10, 2007, Arena® 0.25G (clothianidin) was applied to this turf. Arena® was also applied to about 4.5 acres of turf on hospital property that continued to show a high number of trap catches throughout the season. Turf tractors were used to apply the product at 135 lbs per acre.

Figure 3: 2007 Foliar and Turf treatment map.

Action Plan for 2008

Treatment

Due to the highly polyphagous nature of Japanese beetle (JB), areas have been selected for treatment as opposed to individual host plants. Treatment areas are determined by the number of beetles found in a trap. Areas that showed 2 or more beetles per trap in 2007 will receive both turf and foliar treatments. Increased trapping will be implemented in areas where 1 beetle per trap occurred in 2007. Catches in these traps will alert UDAF to potential JB populations that may require localized treatments.

The number of beetles found in each trap were recorded and then analyzed by ArcMap Spatial Analyst with inverse distance weighting (IDW). The product of IDW analysis is a map showing the probability of a JB occurring within a given area (Figure 2). Because JB were found solely in the 250' and 500' grid only that data was used in the IDW analysis. The resulting probability map was used to determine the 2008 treatment area (Figure 4). The inclusion of a 250' grid within the 500' grid more clearly defined the areas of highest JB population. This analysis is the basis for 2008 recommendations. Areas will be designated as higher priority (Tier 1) or lower priority (Tier 2).

Tier 1: High Probability of JB Occurrence

This area is identified as high risk because of the likelihood of an existing reproductive JB population. Based on the IDW analysis it is probable that 1.01 to 135 JB per trap could occur. This area will receive a turf treatment and multiple foliar treatments to facilitate eradication of the JB. This plan was recommended at a peer review panel meeting with Ohio State University JB experts. Turf will be treated with Merit® 2F at 1.6 pints per acre starting in late June/early July. The treatment will be applied to all turf, flower beds, ornamental plantings, bare soil, etc. The foliar applications would begin at the first detection of an adult JB in the delimiting grid and be repeated every 10 - 14 days during peak adult flight. Foliar applications will consist of two treatments; Carbaryl will be used for the foliar treatments on food crops, and Tempo SC Ultra will be used on non food plants. The estimated treatable area for the foliar and turf in 2008 is 267 acres.

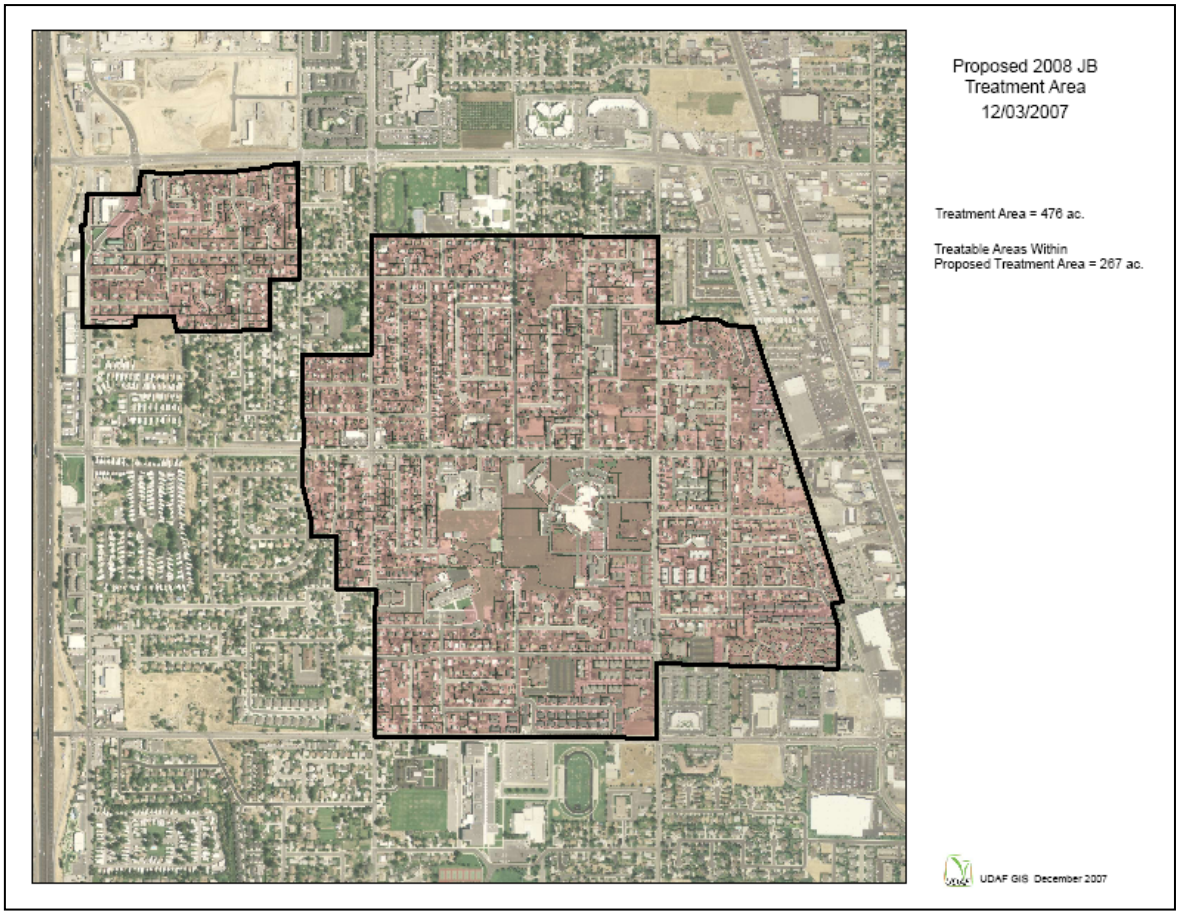
Tier 2: Low Probability of JB Occurrence

These areas consist of 2007 turf treatment areas that had 0 or 1 beetles per trap. Recommendations by the peer review panel include continued trapping in these areas and treatment if a female JB occurs in the traps. Based on published studies, published Merit at the rate of 0.3 lbs of active ingredient per acre is effective against JB larvae in July.

Trapping

For the 2008 trapping program, UDAF plans to continue both detection and eradication programs. Proposed changes will increase the 250' foot grid trapping area by 50% to cover the 2007 treatment area. Outside of the grid area in Utah County, 5 traps per square mile will be placed and the rest of the state will receive 2 traps per square mile. All detection traps will be staggered from the previous trap location to increase overall trapping coverage. Trap totals for 2008 are estimated to be just over 3000 traps statewide. Grid traps will once again be monitored twice a week for weekly totals and all other traps throughout the state will be checked monthly.

Figure 4: Tier 1 areas to receive Foliar and Turf treatment in 2008.



Mormon Cricket and Grasshopper Program

Agricultural Pest
Funded USAD APHIS, UDAF

2007 Survey and Suppression Program

Grasshoppers and Mormon crickets are members of the native ecosystems of the U.S. They play an important role, serving as food for wildlife and contributing to nutrient cycling on rangelands. There are over 700 species of grasshoppers in the U.S. However, the two major species affecting croplands in Utah are the migratory grasshopper *Melanoplus sanguinipes* and the clearwinged grasshopper *Camnula pellucida*. Grasshopper and Mormon cricket *Anabrus simplex* outbreaks occur throughout the states that lie west of the 100th meridian, and they have the potential to significantly impair Utah's $343 million forage crop industry.

Mormon crickets are ground dwelling katydids that inhabit the Western Rocky Mountain basins. During outbreaks they create migratory bands and "march" across rangelands. At very high population densities they may damage the rangeland, but they are chiefly a pest when they enter and devour cultivated crops. Often the damage done to agricultural commodities is increased by the effects of drought. Mild winters and hot, dry weather speed up the maturation process of these insects and allow more of them and their eggs to survive the cold. Drought also reduces the population of birds and rodents that prey on them, and the fungal diseases that decrease insect numbers.

In the 2007 season, Utah Department of Agriculture and Food, in cooperation with USDA/APHIS-PPQ, continued their endeavors to manage the potentially devastating effects of grasshoppers and Mormon crickets in the state.

Grasshopper

All 29 counties in the state were surveyed for grasshopper infestation (Figure 1). Overall infestation acreage has been decreasing each year, but 2006 and 2007 levels were at the same low level. (Figure 2).

Mormon Cricket

All 29 counties in the state of Utah were surveyed for Mormon crickets (Figure 1). Infested acreage decreased by 88% statewide for Mormon cricket (Figure 3). The total infested acreage statewide was 127,929 acres. Both aerial treatment and ground baiting were employed in suppression efforts in Box Elder County (Figure 4). 92,184 acres were treated aerially with Dimilin in a triple swath pattern. Ground baiting was also used in Box Elder County, where 7,475 acres were treated.

Action Plan for 2008

Utah Department of Agriculture and Food and USDA/APHIS-PPQ will continue with extensive surveying in all counties for both Mormon crickets and grasshoppers. Populations were low in 2007, likely due to successful treatment programs (Figure 4). No treatments have been proposed for 2008.

Figure 1. 2007 Mormon cricket and grasshopper survey.

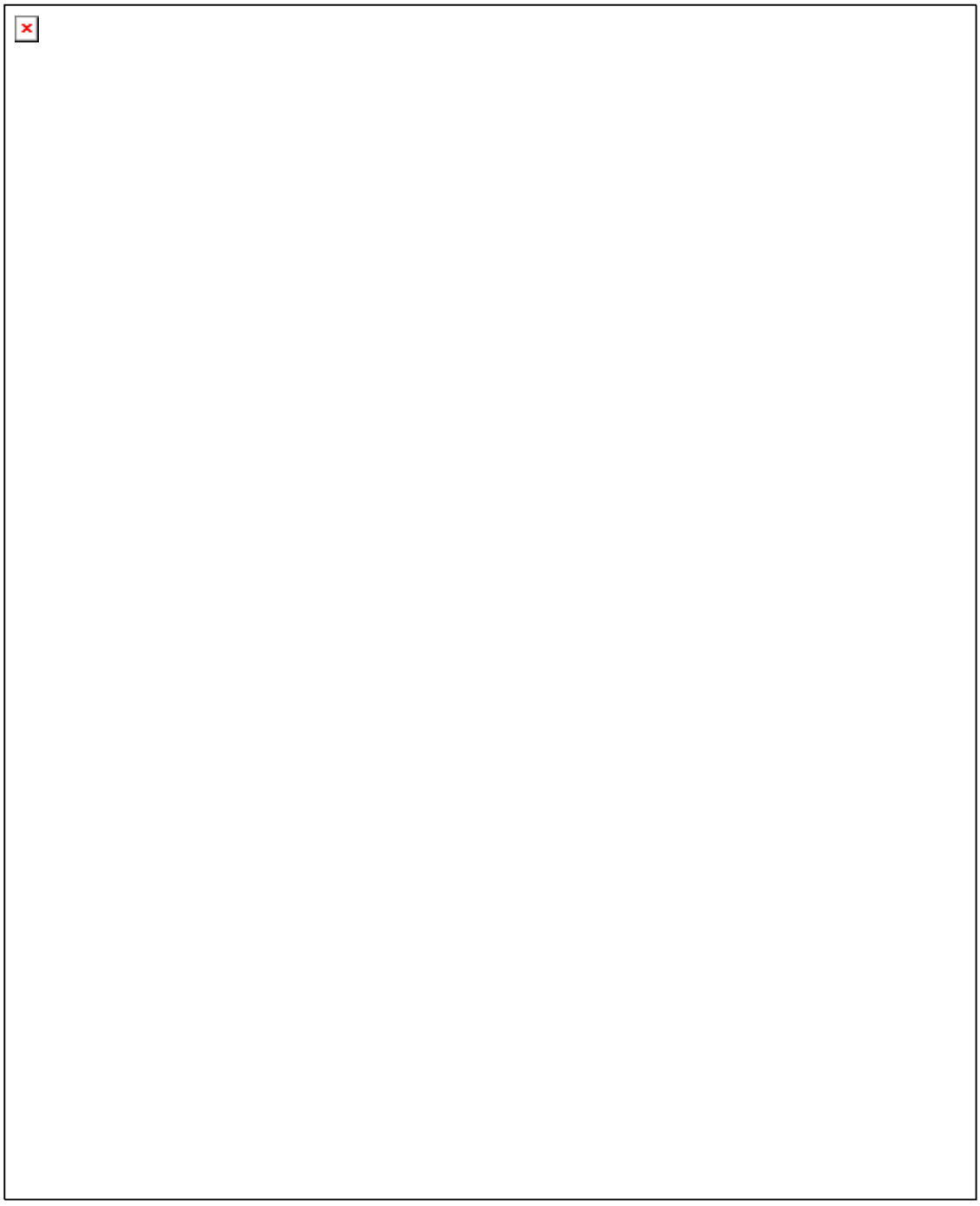


Figure 2. Grasshopper infested acreage by county and year.

Grasshopper Infested Acreage By Year

	2001	2002	2003	2004	2005	2006	2007
Beaver	13,800	4,000	7,000	4,420	5,880	1,800	3,013
Box Elder	120,400	120,000	94,710	6,570	15,200	15,270	13,644
Cache	64,500	17,000	2,200	26,380	2,170	10,490	10,616
Carbon	56,100	21,600		2,700		5,860	1,279
Daggett	4,900		8,530	7,750	1,900		7,769
Davis			2,530		3,010		
Duchesne	82,400	8,700	70,800	230,190		420	3,838
Emery	10,400	6,400		1,710	12,680	21,210	1,652
Garfield	10,900	4,200	52,560	13,780	24,450		2,216
Iron	5,000	12,300	24,540	26,760	17,140	2,780	3,203
Juab	174,000		21,030	8,060	2,250		4,670
Kane	1,300		16,710	13,680	7,570		
Millard	216,800	8,950	6,500	3,590		1,280	2,559
Morgan	63,100		2,530	25,710		5,530	6,989
Piute	18,200	32,600	40,310	5,990	13,870	2,560	5,035
Rich	12,400		32,140	68,830	4,000		
Salt Lake			2,530		2,530		2,479
San Juan	3,900	2,500					1,279
Sanpete	183,500	268,400	142,680	118,920	56,470	3,840	3,838
Sevier	31,000	70,500	78,000	22,870	16,850	3,830	12,417
Summit	3,600	2,550	12,630	33,870		1,280	2,136
Tooele	74,600	161,800	39,000	2,550	16,020	6,170	3,838
Uintah	71,200	53,500	25,750	100,950	12,670	20,510	9,319
Utah	56,400	8,500	15,150	16,440		1,280	2,558
Wasatch	65,600	7,000	17,540	25,250			1,279
Washington	44,100	7,100	150	2,530		4,270	5,752
Wayne	2,000		10,430				
Weber						3,690	1,119
Total	1,390,100	817,600	725,950	769,500	214,660	112,070	112,497

Figure 2. Grasshopper infested acreage by county and year.

2007 Grasshopper Acreage Statistics					
	Federal	State	Private	Tribal	Total
Beaver	2,796		217		3,013
Box Elder			13,644		13,644
Cache	1,356	591	8,669		10,616
Carbon	958		321		1,279
Daggett	2,497	2,028	3,244		7,769
Duchesne		91	3,747		3,838
Emery			1,652		1,652
Garfield	1,749		467		2,216
Iron		146	3,057		3,203
Juab	1,411	183	3,076		4,670
Millard		134	2,425		2,559
Morgan	4	263	6,722		6,989
Piute	4,821		214		5,035
Salt Lake	1	6	2,472		2,479
San Juan	909	7	363		1,279
Sanpete	1,279		2,559		3,838
Sevier	7,473	1,157	3,787		12,417
Summit			2,136		2,136
Tooele	1,855	730	1,253		3,838
Uintah	602	1,063	4,202	3,452	9,319
Utah	311		2,247		2,558
Wasatch	878	392	9		1,279
Washington	3,437		2,315		5,752
Weber	429		690		1,119
Total	**32,766**	**6,791**	**69,488**	**3,452**	**112,497**

Figure 3. Mormon cricket infested acreage by county and year.

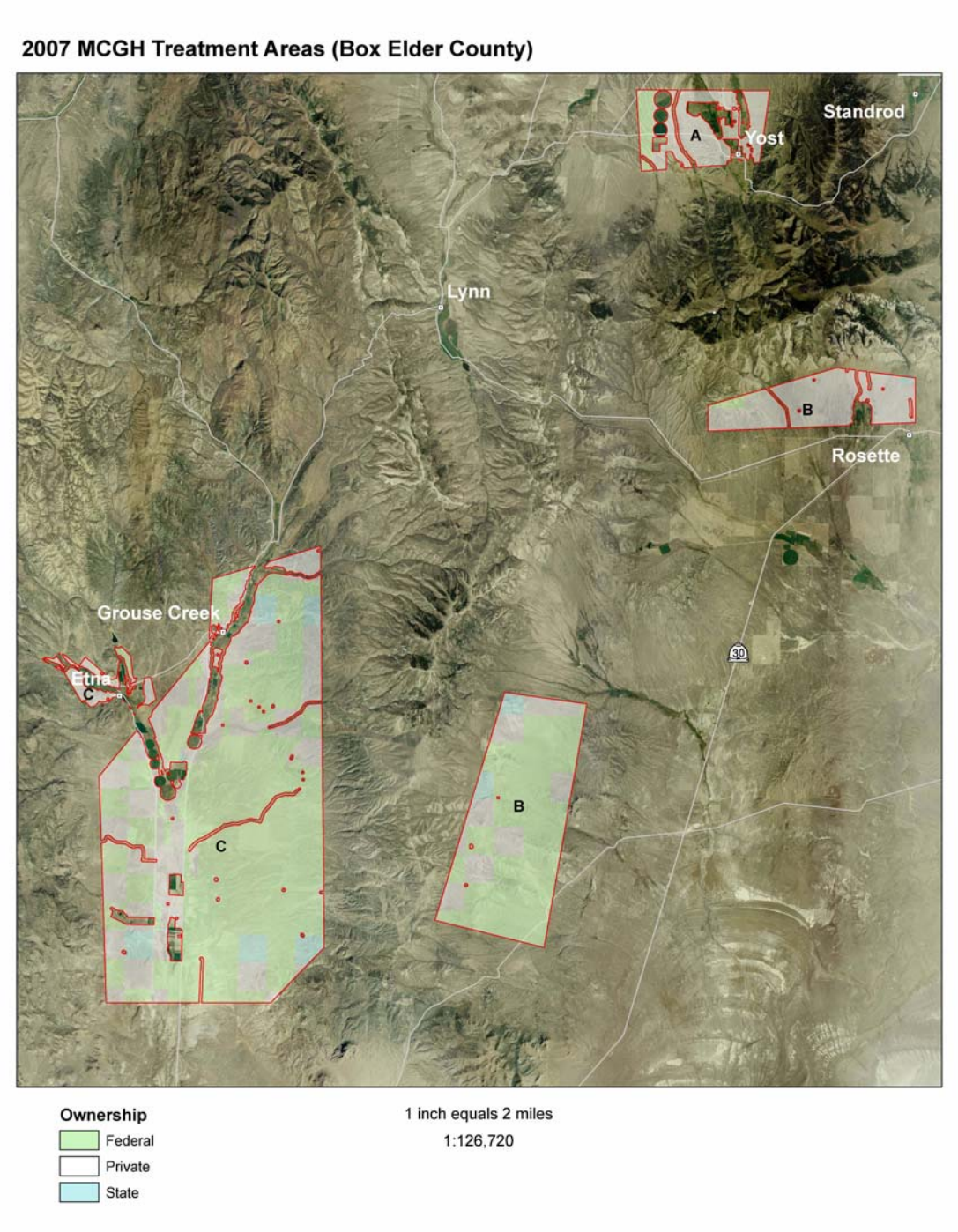
Mormon Cricket Infested Acreage By Year

County	2001	2002	2003	2004	2005	2006	2007
Beaver	7,000	158,500	226,700	257,850	2,540		
Box Elder		108,300	125,900	276,620	499,550	966,340	98,276
Cache	8,100	4,400	8,400	8,260			
Carbon	33,100	33,100	2,530				
Daggett			4,600	21,450	7,610	8,160	7,956
Duchesne	83,900	7,000					
Emery	1,150	1,100	50				
Garfield			2,530	1,650			
Iron			7,600	70,790	3,040		
Juab	502,500	618,900	651,500	680,550	43,160		2,559
Millard	539,500	536,500	517,800	547,700	19,610		
Rich					2,530		
Salt Lake					2,530		1,280
San Juan	18,300	14,400		3,920			
Sanpete			31,760	310	4,380		
Sevier	24,500	85,500	190,200	177,420	1,570		
Summit				2,530			
Tooele	622,000	749,700	793,500	691,050	49,190	11,300	1,279
Uintah	48,800	48,900	31,300		5,070	68,740	16,579
Utah	5,650	74,600	116,200	123,800	3,780	1,280	
Washington				4,600			
Total	1,894,500	2,440,900	2,710,570	2,868,500	644,560	1,055,820	127,929

2007 Mormon Cricket Acreage Statistics

County	Federal	State	Private	Total
Box Elder	53,683	6,352	38,241	98,276
Daggett	3,243	771	3,942	7,956
Juab	938	679	942	2,559
Salt Lake		6	1,274	1,280
Tooele	322	427	530	1,279
Uintah	5,145	5,342	6,092	16,579
Total	63,331	13,577	51,021	127,929

Figure 4. Mormon cricket and grasshopper treatment 2007.



Red Imported Fire Ant Detection Program

Public Health Threat/ Quarantined Pest

Funded by USDA APHIS CAPS, UDAF

James P. Pitts, Kevin A. Williams, Joseph S. Wilson, and Erin W. Hodgson, Department of Biology, Utah State University

Figure 1: Red Imported Fire Ant.

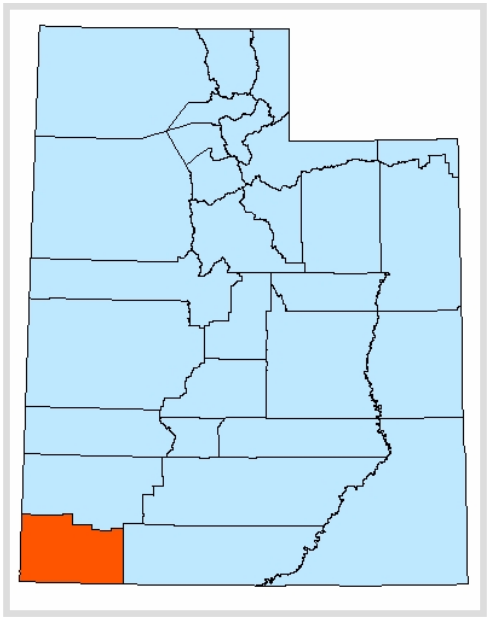


Figure 2: Red Imported Fire Ant alate.

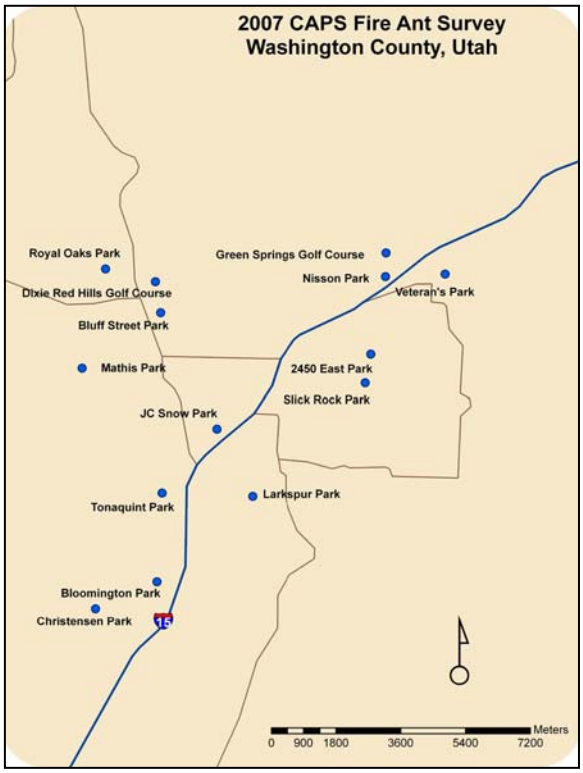
2007 Survey & Detection Program

The red imported fire ant (RIFA) is both a public health and an economic threat. It is a federally quarantined pest and is not known to occur in Utah. Imported fire ants were first introduced to the southern United States in the 1930's from South America. Imported fire ants can feed on many agricultural crops, including corn, soybean and fruit trees. Established ant mounds have more than 200,000 members and can reach over two feet high. The above ground mounds make cultivation, irrigation and harvesting almost impossible. Large numbers of imported fire ants can kill young crops, and plant damage is exacerbated during drought-stress periods. Imported fire ants can also infest urban areas and become a nuisance pest that deters outside activity. For example, golf courses, parks and private homes can be devastated because ant colonies can permanently damage turf and woody ornamental plants. Not only are imported fire ant mounds unattractive, but ants are aggressive and can sting humans and other animals. Some humans and domestic animals are sensitive to the ant venom and multiple stings can be potentially fatal. This survey will help detect

early migrating alates of *Solenopsis invicta* (RIFA; Figures. 1, 2), and the black imported fire ant, *S. richteri* (BIFA), in southern Utah and may ultimately prevent establishing colonies with timely eradication.

The Utah Department of Agriculture and Food is approaching the red imported fire ant concern with pit fall trapping, quarantine enforcements, port of entry inspection, and public education. In 2007, program activity was focused in Washington County, because that habitat was identified as the most likely area for immigrating alates to be detected in Utah based on climate and other habitat preferences. During 1-4 June 2007, nine parks and two golf courses in Washington County were intensively surveyed for *Formicid* spp. (Figure. 3). In particular, the presence or absence of native *Solenopsis* spp. was noted at every site. On 9-10 August 2007, sampling was replicated at ten parks in Washington County. At each location, a representative sample of ants was collected and until they could be sorted with a stereomicroscope. In the lab, ants were identified to the lowest taxon. Of the fourteen parks and golf courses sampled, representative ants from eleven genera were collected; however, RIFA or BIFA were not detected at any of the sites. A native *Solenopsis* species, S. *xyloni*, was detected at twelve of the sites, and indicates RIFA/BIFA have not yet established in Washington County, Utah. Utah is still free from imported fire ant populations.

Figure 3: Locations of Fire Ant Survey 2007.



Action Plan for 2007

Red imported fire ants are a serious threat to Utah's economy. In 2008 UDAF will continue its cooperative program of public education, quarantine enforcement, and detection trapping. Additional state and federal funds have been applied for through the Cooperative Agricultural Pest Survey (CAPS) Program. These monies will be used to support this program with cooperators at Utah State University.

West Nile Detection Program

Public Health Threat

2007 Program

West Nile Virus was first detected in the State of Utah during the summer of 2003. This disease again appeared in Utah during the summer of 2006. In 2007 Utah had 67 cases of West Nile Virus with 2 resulting deaths.

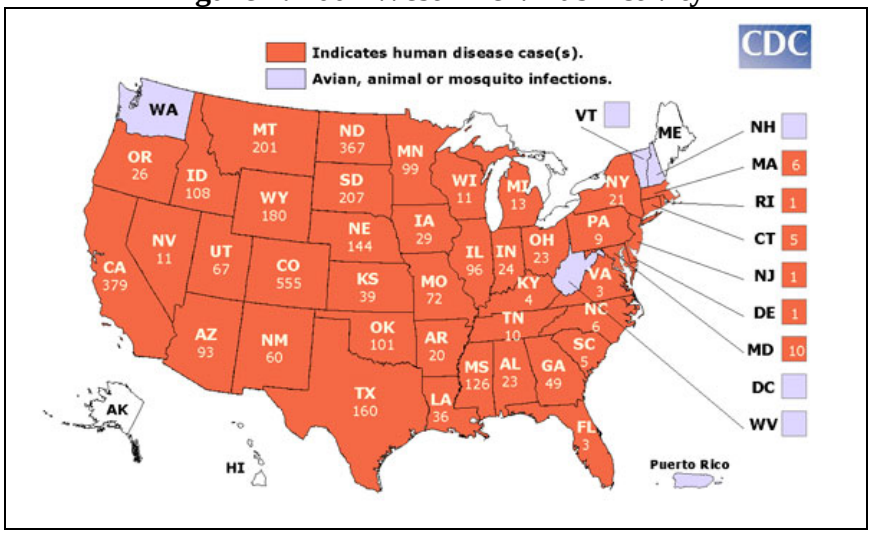
West Nile Virus is a disease transmitted by mosquitoes. In Utah, two principal mosquito vectors of West Nile Virus are: 1) *Culex pipiens* (the house mosquito) and 2) Culex *tarsalis* (the marsh mosquito). The activity and biting period for these species is almost exclusively from dusk until dawn. Birds are the natural hosts of the disease with humans and horses serving as secondary hosts. The majority of people infected with West Nile Virus never develop symptoms. However, a small percentage may develop symptoms such as fever, headache, body aches, etc. A more serious form of the disease can occur when the virus infects the central nervous system.

Mosquito surveillance with additional control efforts were implemented in 2006. The State Legislature provided UDAF with $150,000 to fund these additional control efforts. Sentinel chicken flocks were increased, surveillance of wild bird populations was continued, domestic and wild horses were tested, and mosquito abatement was continued.

Action Plan for 2008

If funding is again provided, UDAF plans to continue the West Nile Virus Program with an emphasis on increased mosquito control to reduce West Nile Virus as a public health threat. UDAF will also continue to conduct education and outreach on issues concerning West Nile Virus and mosquito abatement program.

Figure 1: 2007 West Nile Virus Activity



Sirex noctilio woodwasp Detection Program

Defoliator

Funded by USDA APHIS CAPS, UDAF

Counties with Traps

2007 Survey & Detection Program

Sirex noctilio Fabricius is considered a secondary pest in their native range of Europe, Asia and northern Africa; however recent invasions to New Zealand, Australia, South Africa and South America have been particularly devastating to pine trees. Tree mortality of 80% has been documented in pine plantations due to *S. noctilio* larvae in the Southern Hemisphere. Unlike native woodwasps, *S. noctilio* females will oviposit in suppressed, stressed and injured pine that is still alive. A combination of fungus, *Amylostereum areolatum*, and mucous injected during oviposition can rapidly weaken and kill healthy trees. The life cycle may take more than 12 months and is conducive to transport in solid wood packing materials. *S. noctilio* is likely to establish in any climate zone in North America where pine occurs, particularly Monterey and loblolly species. Utah has two susceptible pine species: ponderosa, *Pinus ponderosa*, and lodgepole, *P. contorta*. In addition to surveys of forested areas at high risk, survey of solid wood packing materials can help detect accidental releases to established pine stands in Utah. The early detection and eradication of this exotic woodwasp could minimize or avoid a severe economic and environmental impact of *S. noctilio* infestation.

The 2007 survey and detection program focused on 23 high risk locations in 4 counties with host material in the vicinity or substantial wooden shipping material traffic. Each was baited with an ultra high release lure containing 70 % alpha-pinene 30% beta-pinene and serviced every two weeks. Specimens were collected by collaborators at Utah Division of Forestry, Fire and State Lands and identified at UDAF.

All collected specimens collected were native non-pest species. Specimens were preserved to harbor a reference collection at UDAF.

Species collected	Number of specimens
Sirex cyaneus Fabricius	7
Sirex longicauda Middlekauff	1
Tremex columba (Linnaeus)	2
Urocerus gigas flavicornis (Fabricius)	2
Xeris morrisoni indecisus(MacGillivray)	1
Xeris spectrum spectrum (Linnaeus)	1

Action Plan for 2008

If funding is again provided, UDAF plans to continue the *S. noctilio* survey. These insects pose a threat to Utah's forests. Prevention and early detection are our best defense strategies.

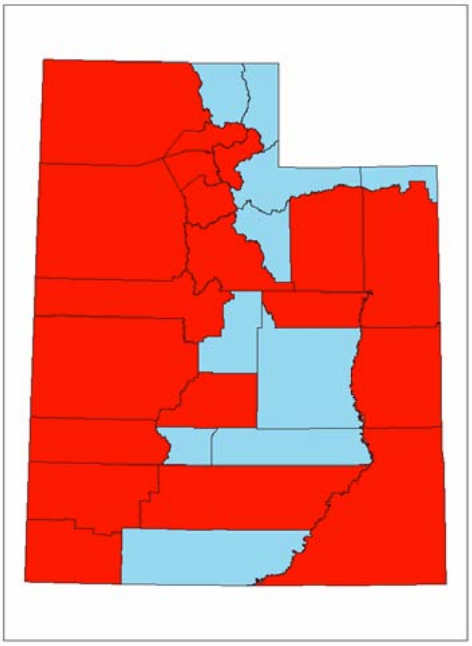
Exotic Wood Borer and Bark Beetle Detection Program

Quarantine Pest

Funded by USDA APHIS CAPS, UDAF, USDA FS EDRR

2007 Survey & Detection Program

Counties with Traps



Utah Department of Agriculture and Food (UDAF), Plant Industry performed a survey for invasive wood boring bark beetles and long horned beetle with funding provided through the Cooperative Agricultural Pest Survey Program (CAPS) which is administered by United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Plant Protection Quarantine (PPQ), and USDA Forest Service Early Detection and Rapid Response (EDRR) Program. Further cooperation was provided by the Port of Salt Lake Customs and Border Protection. The introduction of exotic wood boring insects could take a serious toll Utah's 329 million dollar wood products industry (USU 2006). Exotic forest insects pose a significant threat to the economic viability of this industry. The Utah ornamental industry generated 43 million in sales during 2006 (UDAF 2006). The risk of introduction is great considering the increased demand for inexpensive commodities from the continent of Asia. The pests are introduced from wood packing material and other raw products; tile, stone, and dunage that are brought in by sea containers to the state via railroads and trucking industries.

Trap sites were selected in areas that receive raw or unrefined products and wood packing materials. In 2007, 25 trap sites were chosen throughout 17 counties. Each site contained three Lindgren funnel traps baited with ethanol and a-pinene lure, *ips* complex lure, and ethanol lure, respectively. Each trap was collected biweekly, screened for target species or species of interest, and stored at UDAF. Traps were generally set in April and retrieved in November. All specimens were screened by Dan Clark of UDAF and further identified by to species by Josh Vlach, Jim LeBonte, and Rick Wescott of Oregon Department of Agriculture in conjunction with the USDA Forest Service Early Detection Rapid Response Program. Confirmation of select specimens was done by Dr. Stephen Wood (Emeritus), Curator of Insects at the Mont L. Bean Museum of Life.

2007 New Utah State and County records:

a. *Hylastes opacus* (Coleoptera: Curculionidae: Scolytinae) in Salt Lake, Weber and Utah Counties. Specimens were collected in Lindgren funnel traps as part of the EDRR/CAPS Wood Borer Survey, and are now part of Utah Department of Agriculture and Food entomological collection. *Hylastes opacus* is a European exotic established in the eastern U.S. and parts of the west.

b. *Hylastes asperatus* (Coleoptera: Curculionidae: Scolytinae) in Wasatch County. Specimen were collected in Lindgren funnel traps as part of the EDRR/CAPS Wood Borer Survey, and are now part of Utah Department of Agriculture and Food entomological collection. *Hylastes asperatus* is native to the South Western United States; this specimen represents a new State record for Utah.

c. *Chrysobothris nixa* (Coleoptera: Bupretidae) in Tooele County. Specimen were collected in Lindgren funnel traps as part of the EDRR/CAPS Wood Borer Survey, and are now part of Utah Department of Agriculture and Food entomological collection.

d. *Chrysobothris arizonica* (Coleoptera: Bupretidae) in Garfield County. Specimen were collected in Lindgren funnel traps as part of the EDRR/CAPS Wood Borer Survey, and are now part of Utah Department of Agriculture and Food entomological collection.

e. An unknown buprestid beetle is currently being identified by R. L. Wescott, Oregon Department of Agriculture. The beetle was collected in Lindgren funnel trap in Iron County as part of the EDRR/ CAPS Wood Borer Survey.

In addition, other mounted specimens of interest collected in 2007 are now part of UDAF's ongoing reference collection which will aid in future identification of native and non-native insect species.

Figure 1: TARGET INSECTS FOR SURVEY	
Scientific Name(s)	**Common Name(s)**
Agrilis planipennis (Fairmaire)	Emerald Ash Borer (EAB)
Anoplophora chinensis (Forster) = *Anoplophora malasiaca* (Thompson)	Rough Shouldered; Citrus Longhorned Beetle(CLB)
Anoplophora glabripennis (Motchulsky)	Asian Longhorned Beetle (ALB)
Callidiellum rufipenne (Motchulsky)	Lesser Japanese Cedar Longhorned Beetle
Chlorophorous annularis (Fabricius)	Bamboo/Tiger Bamboo Longhorned Beetle
Hesperophanes (Trichoferus) campestris (Faldermann)	Chinese Longhorned Beetle
Hylurgops (Hylurgus) palliatus (Gyllenhal)	N/A
Hylurgus ligniperda (Fabricius)	Red-haired Pine Bark Beetle
Ips sexdentatus (Boerner)	Six-toothed Bark Beetle
Ips typographus (Linneaus)	European Spruce Bark Beetle
Monochamus alternatus (Hope)	Japanese Pine Sawyer
Pityogenes chalcographus (Linneaus)	Spruce Engraver
Tetropium castaneum (Linneaus)	N/A
Tetropium fuscum (Fabricius)	Brown Spruce Longhorned Beetle (BSLB)
Tomicus minor (Hartig)	Lesser Pine Shoot Beetle
Tomicus piniperda (Linneaus)	Pine Shoot Beetle; Japanese Pine Engraver
Trypodendron domesticus (Linneaus)	N/A

Action Plan for 2008

Assuming continued funding, trapping procedures will remain the same. Trap locations will continue to target areas with a high risk of target species introduction such as businesses importing from Europe and Asia. In particular, more traps will be placed in proximity to businesses dealing foreign motorcycles due to the high volume of hard and soft wood packaging materials. UDAF will continue to coordinate with Port of Salt Lake and SITC hot zone lists to target areas for trap placement and visual inspections. Wood processing areas will also be targeted for trapping. Detection in these areas will either confirm known existing species or reveal new species present in Utah's urban and natural forests.